

REMARKS

In the office action, the examiner rejected all claims (claims 1-26). Independent claims 1 and 17 are rejected as anticipated by US 6,388,577 to Carstensen. Independent method claim 15 is rejected as obvious in view of Carstensen combined with US 5,704,426 to Rytlewski. Applicants respectfully traverse all of the examiner's rejections, and request that the examiner re-examine and reconsider the application in the light of the following comments.

Applicants contend that the examiner has misunderstood the teachings of Carstensen, or the teachings of the present application, or both.

Just as in the case of the Garcia-Soule patent (see response to first office action), the Carstensen patent is a good example of current technology discussed at length in the present application to illustrate the need for the present invention. Carstensen discloses a pressure-pulse method of actuating a remote, controllable downhole device such as a valve or a pipeline cleaning "pig." Carstensen's system is an example of "current technology that requires skilled operators at the surface doing the thinking and actions required to generate each downhole event." (Paragraph 30 of the present application) A stimulation example is given in the present application of a sequence of thirteen downhole operations that can be initiated by a single "application of pressure" (quote from claim 1) by a human operator, but once initiated, proceeds on its own with the remote intervention logic valve ("RILV") or its equivalent acting as the "downhole brain" (quote from paragraph 10 of the present application). To perform those thirteen operations using only Carstensen's teachings would require that the intelligent human on the surface send not one "application of pressure" downhole as with the present invention, but instead thirteen different complex coded pressure impulses to the tools down below. (Carstensen, col. 4, lines 27-29) Moreover, Carstensen's human intervener would need to decide the timing and sequencing of the thirteen events. (Carstensen, col. 4, lines 12-14; see also col. 6, line 51.)

With editing to remove the features clearly not taught or suggested by Carstensen, Applicants' claim 1 reads:

We claim:

1. A system of two or more valves wherein said valves operate over a designated pressure interval and are arranged to actuate performance of a sequenced set of one events by one or more downhole tools with the application of pressure to said valves.

It can be argued that Carstensen discusses valves. This is true in connection with his air gun pressure pulse source where he discloses shutoff valves 23 and fast acting solenoid control valve 25. There is however no suggestion that these valves are pressure actuated, and a solenoid valve is obviously electrically actuated. Furthermore, all these valves help operate is the pressure pulse source, which is not the "downhole tool" that either Carstensen's invention or the invention of Applicants' claim 1 is intended to operate. The "system of two or more valves" in Applicants' claim 1 is Applicants' RILV or the equivalent, i.e., the downhole brain. Carstensen's invention has no counterpart (this function being performed in his invention by the smart human operators on the surface). A valve is also mentioned by Carstensen as an example of a single-operation downhole device that could be commanded remotely using his invention (such as his valve 60), but not as a component of a "pressure-driven downhole computer." (Paragraph 10, present application) These distinctions are critical. It is also noteworthy that Carstensen contains nothing equivalent to Applicants' detailed discussion of how a "system of two or more valves" can be designed so as to function as the "downhole brain." Even if Carstensen were somehow read to suggest this concept, there is no explanation given of how to accomplish it.

The examiner points to specific parts of the Carstensen patent in his anticipation case against claims 1 and 17. Figs. 1-4 and 9 are singled out, but none of them show any equivalent of the RILV (downhole brain) described in Applicants' claims and specification. It might be mistakenly concluded that the control circuitry

75 in Fig. 3 could fulfill such a function. Instead, this pertains to how a downhole pressure-pulse signal sent by a human operator is detected, decoded and interpreted so that a downhole tool may be commanded to perform a single operation. The passage from col. 5, line 42 to col. 6, line 65, is devoted to how an air gun is used to provide the pulsed pressure signal, coded to command a downhole tool to perform a single operation. The valves in the air gun have no relation to the system of valves that Applicants show can be made to function as a downhole brain. If this disclosure could be taken to apply to any feature in Applicants' claims, it would have to be the "application of pressure" that initiates a sequence of commands by the RILV or its equivalent, and it would be an unnecessarily complicated embodiment of that single feature of Applicants' claims. As explained above, this passage does not teach or suggest the "system of two or more valves" that Applicants show can be made to be a downhole brain that actuates performance of a sequence of events by one or more downhole tools. Lastly, the examiner points to col. 11, lines 25-35. This is obviously cited because it mentions two valves, a crown valve **110** and a manifold jumper valve **112**. These valves have nothing to do with a downhole brain that can actuate performance of a sequence of events by one or more downhole tools. Instead, they merely illustrate one application where, when these two valves are open, the pressure signal sent by a smart human up on the surface can reach the downhole tool **116** when the well it is located in happens to be a subsea well. This is still human activation of a downhole tool, one event (operation) at a time, nothing else being disclosed, suggested or enabled anywhere in Carstensen.

Paragraph 21 of the present application discusses existing technology with the following words: "Downhole events such as [the sequence of thirteen operations] are typically initiated and actuated from the surface using one or more of the following control elements to create a single downhole operation: (1) . . . (5) pressure." (Emphasis added.) These words were written with systems such as Carstensen's in mind. Proper understanding of the present application shows that Applicants have not merely reinvented the very thing they intended to improve upon. The edited version of claim 1 above, supported by the discussion before and after, demonstrates vividly

that Carstensen does not anticipate Applicants' claim 1. Similarly, Carstensen cannot anticipate the other independent claims (15 and 17) because they include all the words in claim 1 pertinent to the preceding discussion of claim 1, and thus Carstensen does not disclose these features which are, in essence, Applicants' "downhole brain." Rytlewski does not disclose anything that teaches or suggests these features. In rejecting claim 15 as obvious over the combination of Rytlewski and Carstensen, the office action relies on Carstensen as disclosing the downhole brain feature of claim 15, i.e., the feature described by the words

"wherein at least one of said steps is actuated by a system of valves that operates over a designated pressure interval and is arranged to actuate performance of said step with the application of pressure to said valves."

Since it is demonstrated above that Carstensen neither teaches nor suggests such feature, the obviousness rejection of claim 15 cannot stand.

Since all three independent claims are patentable over the art cited by the examiner, there is no need to discuss the reasons given for rejecting the dependent claims.

Conclusion

Each of the claims of the application is limited to Applicants' inventive system and method for actuating a sequence of events in downhole tools without additional human intervention after the initiating application of pressure. Each of these claims is believed to be patentably distinct from all known prior art, including all art cited by the examiner. Therefore, Applicants respectfully request allowance of all pending claims. If the examiner wishes to discuss this application with counsel, please contact the undersigned.

Respectfully submitted,

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